

XLIV.—*Some Notes on the Botany of Sinde.* By Captain N. VICARY, 2nd European Regiment\*.

THE following notes have been made from plants, collected under considerable difficulties, at seasons (Dec., Jan., Feb.) the worst that could be selected for collecting plants, or when I was accompanying an army in an enemy's country, with scarcely the means of transporting my private baggage. I mention this merely to show that much remains to be done of botanical interest in Sinde, and that my collection gives but a limited, although a characteristic idea of the plants that flourish in that region. The flora of Sinde falls naturally into three divisions, that of the hills, the plains, and the coast. The hills, being either the bases or outliers of the Hala range, are barren in the extreme, owing to the want of rivers, the rareness of natural springs, their saline nature where they do exist, and the absence of periodical rains.

Little that could be called soil exists; a few of the intervening valleys only are favoured with arable land.

The hilly country generally presents a most desolate and barren appearance—little vegetation meets the eye—scarcely anything but the bare, broken, pale or rusty yellow tertiary strata of which they are composed. My Beloch guides informed me that rain at a proper season falls on an average about every fourth year, that shortly afterwards vegetation appears abundantly, and that on those occasions the Beloches are in the habit of collecting and storing dried grass; at such seasons the botanist would doubtless find much to excite attention, but at any time the few plants found are very interesting.

A species of palm is very abundant in this division, near springs and lining the banks of water-courses. If not new, I believe it to be *Chamærops humilis*, but I have seen neither flowers nor fruit. The tree has scarcely any stem above ground; the leaves are flabelliform, and the petioles channeled with lacerate stiff margins. The denuded and dry spadix of one tree which I saw was about six feet high, with numerous lateral branchlets. The Beloches make sandals of the leaves of this tree. A *Viola* is found near water-courses, nearly allied to, if not identical with, *V. patrinii*.

A species of *Reaumuria*, with leaves differing somewhat from the described kinds, also exists on the tops of some of the lower hills. This, and a Scrophularineous plant (*Anticharis*), are the most ornamental plants found in the Lower Halas.

A *Grewia*, allied to *G. sapida*, forms small shrubs rising from the fissures of the rocks; its small red berries are eatable.

\* From the Journal of the Asiatic Society of Bengal for Nov. 1847.

*Orygia trianthemoides* is found near the base of the hills, *Hepthophyllum tuberculatum* in the upper valleys, and *Peganum Harmala* everywhere. I found *Tribulus alatus*, Del., and *Calligonum*, both Egyptian forms, at the base of the hills; a species of *Zygophyllum*, differing little from *Z. simplex*, is found forming dense matted beds near springs in the upper valleys. *Seezenia*, a Sierra Leone genus, is abundant both in the hills and at their bases; also a new species of the Cape genus *Monsonia*. *Neurada procumbens*, an Egyptian or Arabian plant, is plentiful on the borders of the Sinde desert, and also in the hills, is particularly plentiful too near Shahpoor on the western border of the desert. On the sand-hills at the same place I found species of *Rhazya*; it is a pretty small shrub with so much the habit of the garden oleander, that our sepoy called it "Bun Kunale." It is also found throughout the hills, but invariably in sandy places.

A species of *Forskalea* with ovate leaves is abundant in some places amongst the hills; the leaves of this plant adhere to everything with great tenacity, and can only be removed piecemeal; the whole plant is clothed with sharp hooked hairs.

A *Sophora*, with pretty yellow laburnum-like flowers, is also found amongst rocks near water, accompanied by *Linaria ramosissima*, and a variety of *Lindenbergia urticifolia*. Several species of *Salsola* are also abundant; one in particular in the hilly country with terete pungent leaves and axillary capitate inflorescence, of which unfortunately I am without specimens. A new species of the African genus *Limeum* is also found on the skirts of the Halas. *Plantago amplexicaulis* is found in the inner valleys along with *Haplophyllum*. An *Echium* of the Cape type, and possibly new, and *Trichodesma Africanum*, R.B., are abundant in the fissures of rocks amidst the higher hills.

*Salvia primula-Ægyptiaca*, and a new species of the same section, are widely spread through the hills. A new *Linaria*, very like *L. triphylla*, is found from the base of the hills upwards.

*Solanum Forskalii*, or a species akin to it, is also abundant. *Hyoscyamus muticus* is found in moist places. An Asclepiad, with the habit of *Orthanthera viminea*, is very abundant on the margins of water-courses; it forms a large bushy shrub, and I suspect is the same plant described by my friend Dr. Falconer as "*Campelepis*." *Cometes Surattensis* is found occasionally along the whole base of the Hala mountains; a *Caralluma* or some nearly allied plant is abundant on the higher ranges, but I never saw it in flower; a new and pretty species of *Cleome* is found in the passes leading into the Hala range at a low elevation: with this I close my notice of the hilly region of Sinde.

The plains of Sinde are of a very variable character, some places being very fertile, and others barren, and naked desert

with little to be seen except *Salsolæ* and *Tamarisk*, and even these affect the borders of desert places.

The tamarisk on the borders of the desert in some places yields a considerable quantity of manna; it exudes from the bark of the younger branches in the form of translucent tears. It is collected in some abundance in the neighbourhood of Meher, south of Larkhana, and used to adulterate sugar; my servants eat a considerable quantity of it without being in any way affected. In fact they were wonder-stricken, and returned thanks to God for having miraculously created sugar in the desert jungle. I had about a seer of it for near a year; it remained unaltered, and was at last destroyed by exposure to rain.

This species of manna is noticed by Dr. Royle in his 'Illustrations of Botany,' p. 214. I saw neither flowers nor fruit, so cannot speak as to the species, but the shrub has the habit and appearance of *T. gallica*.

The little desert of Sinde flanks the base of the Hala range, varying from ten to twenty-five miles (or more) in breadth, extending in a southerly direction to beyond Meher, where it narrows to three or four miles, and there are more or less extensive patches of desert nearly as far south as the Munchaul Lake. In a northerly direction branches of the desert extend to near Mitun Kote, flanking the base of the Boogtee Beloch hills (spurs of the Halas) upon which Deyrah and Kahun are situated. This tract is sometimes called the Burshoree desert, from the name of a halting-place on the other side, N.W. of Shikarpoor. The soil is a hard-baked yellow clay, often exhibiting proofs of lacustrine or alluvial origin, generally extremely arid and devoid of all vegetation. In some places even in the heart of the desert *Salsolæ* are abundant, in others the surface for miles is perfectly naked; in many places saline matter abounds, efflorescing and whitening the surface, or cementing the soil, which crackles under the feet as if ice-bound; saltpetre is or has been manufactured at the southern end of the desert. It will be seen that but for the Indus this desert would form a branch of the great Jeysulmeer desert, which in some places south of Bhawalpoor approaches the Indus so closely that its sands are poured into the stream; hence we may expect the vegetation on the borders of both to be somewhat similar.

Not far south of Bhawalpoor a species of *Anabasis*, very like (if not identical with) *A. florida*, makes its appearance; this plant abounds on the borders of the desert, and on both banks of the Indus wherever the desert approaches.

The borders of the Sinde desert are usually belted with sand-hills, and outside them a belt of *Acacia catechu* of greater or less breadth.

I have already noticed *Monsonia* as existing on the western borders of the desert ; I also found it in desert places in Lower Sinde.

*Antichorus* (*Corchorus*) *depressus* abounds on the desert borders, particularly at Khangurh ; *Physalis somnifera* is also found here, and extends into the hill valleys. In Lower Sinde, south of Sewan, a species of *Euphorbia*, very like *E. pentagona*, abounds in many places forming impervious patches of jungle : near Kotree, and also between that place and Sewan, I found an "*Ochradenus*," I believe identical with the Egyptian *O. baccatus*, Delisle. *Fagonia* is abundant throughout Sinde, both in the hills and plains ; I have no specimens, but considered the species to be *F. Mysorensis* ; the flowers are pale purple.

At Meher and some other places a species of sugar-cane is in cultivation, which I believe to be unknown in India ; it is called "Buhadooree ;" the stems are slender and trailing ; they grow to ten or fifteen feet in length, the base not being thicker than a finger ; ten or twelve are usually fastened together so as to afford mutual support ; the cane is said to yield the best sugar, but in small quantity. *Cleome ruta*, Jacqt., is abundant on the rocks at Sukkur and throughout Sinde. *Typha angustifolia* is found on most lands subject to the annual flooding of the Indus, and from it vast quantities of mats are manufactured. A species of *Adenantha*, I believe *A. pavonia*, is often found near villages in Lower Sinde ; this tree has a weeping habit, and at a distance looks not unlike *Salix Babylonica*. A remarkable species of *Acacia* is also found near villages ; in its mode of growth and appearance it strongly resembles the funereal cypress. The Sindeans call it "Cauboolce Baubool," a name which points to its foreign origin.

I was not fortunate enough to see this tree either in blossom or fruit. Between Kotree and Kurrachee I noticed a species of wild cotton trailing up trees to twenty feet ; I was sick in a doo-lee at the time and unable to take specimens.

*Dodonaea Burmanniana*, and I believe another species, are found in Lower Sinde. *Aristolochia bracteata*, and a *Verbena* akin to *V. officinalis*, but perhaps distinct, exist on the smaller hills of Lower Sinde ; *Orthanthera viminea* abounds throughout Sinde and is a very useful plant ; like many others of its order, the bark yields a strong fibre ; in this shrub it is of greater length than perhaps in any other Aselepiad. I am not aware of the fibre being used by the Sindeans, but the thin osier-like branches are bruised, and twisted into a strong coarse kind of rope in common use.

There are also numerous well-known Indian forms of plants in the plains of Sinde, particularly near the cultivated districts, of which I took neither notes nor specimens ; the date flourishes

in several parts of Sind, but thrives best at Sukkur and its vicinity, on both banks of the Indus. There are two varieties: one with pale yellow, and the other with brown fruit; the fruit is smaller than the Egyptian date, but when ripe is very palatable; only certain trees produce good fruit, about a third of the whole perhaps. The fruit of the remainder is injured by tapping for the juice, from which sugar is manufactured.

The plants of the coast are of a mixed and peculiar character, and many of them belong to more northern genera. *Serræa incana*, Cav., grows plentifully on the sand-hills of the coast; the only known species of this genus is a native of Succotra, and is described as being only three inches high. The Kurrachee plant forms a bush two feet in height, and when in flower is very pretty; perhaps it may be a new species.

A very hoary *Atriplex*, not far removed from *A. verruciferum*, is also very plentiful: *Ipomæa bilobata* spreads over the sand in every direction, and *Scævola Taccada*, Roxb., is abundant on the tops of the sand-hills; the berry is white at first, but turns purple when ripe. A new species of *Ægialitis* is also found all along the coast, and a new shrubby plant of the *Paronychiæ*, with the bark and almost the leaves of an *Equisetum*.

*Cadaba Indica*? grows on the rocks at Minora Point; I also noticed this plant in the Hala mountains, but am rather doubtful as to the species; I have only seen the cucumber-shaped fruit which is made into a pickle by the Sindeans.

I shall now proceed to notice *seriatim* such plants of my herbarium as appear to me deserving of elucidation.

#### UMBELLIFERÆ.

Indigenous plants of this class are rare in Sind; I have but one specimen from the Hala mountains, which for the present I have referred to—

1. "*Libanotis*;" the plant smells strong of *asafoetida*.

#### RHIZOPHORACEÆ.

I found a fresh flowering branch of a tree of this class floating in the surf on the beach at Kurrachee, but nowhere detected living trees.

2. It belongs to the genus "*Ceriops*" of Arnott; the many mouths of the Indus will doubtless afford others of this order.

#### CRUCIFERÆ.

3. A species of *Farsetia* abounds from Bhawalpoor throughout Sind; it is often the only food procurable for camels, who eat it greedily along with a frutescent *Crambe*? In the Hala mountains it is used for the same purposes.

## CAPPARIDÆ.

4. *Cleome ruta*, Jacqt. : Sukkur and other rocky places in Sinde. The petals are pink, and bear at the base of each a fringed scale.

5. *Cleome fimbriata*, Vic. : lower hills in Sinde.

Stems and leaves hispid from gland-capitate stiff hairs; leaves all simple, lower ones long-petioled, round-cordate, quintuple-nerved, outer lateral nerves lost in the margin, three medial nerves stronger and inarcuately reaching the apex. Upper leaves smaller, subconform narrower, subsessile; flowers pale purple? from the terminal axillæ; pedicels lengthening in fruit; calyx clothed with gland-capitate hairs. Sepals four, subequal, lanceolate. Petals four, shortly clawed with acute oblong-deltoid laminae, apices bearing out gland-capitate hairs, and ciliate with them; bases toothed slightly on the margins, and bearing above claw transverse free fimbriate petaloid scales. Fertile stamens four, rather longer than petals, one anther larger, torus small. Ovary subsessile, linear, rather rough; style caducous, cylindric, short; stigma discoid, capitate. Capsule linear-cylindric, furrowed on opposite sides, shortly stipitate, densely clothed with strongly stipitate, peltate glands, one-celled, two-valved, valves separating from the placentiferous narrow replum; seeds numerous, cordiform, smooth, amphitropous. I have given my note of this plant, as it seems to be not far removed from *C. Droserifolia*, Del.; and perhaps eventually it may prove to be the same.

6. *Cleome rupicola*, Vic. : passes leading into the Hala range of mountains and lower hills.

This plant is not unlike *C. glauca*, DeC., vol. i. p. 239, but the stems and leaves of my plant are clothed with scattered gland-headed hairs, and the young branches are four-angled. Leaves elliptic, ovate and obovate, petiolate, upper leaves reduced to linear-lanceolate bracts. Racemes often six inches long. Petals orange-rufescent, secund, smooth; stamens secund, in an opposite direction to petals, six; gland of the torus semilunate; siliques pendulous, falcate, flat, subsessile, fifteen lines long, two lines broad, bearing some scattered capitate hairs; seeds densely beset with brown hairs, numerous.

7. *Cadaba Indica*?: on rocks near Kurrachce and Hala mountains.

I am doubtful about this plant, having seen it only in fruit. The leaves near the apices of branches are often supported by two stipulary thorns. The fruit is nutant, longly stipitate and cucumber-shaped, bluntly trigonal, three to four inches long, and turning red when ripe.

## RESEDACEÆ.

8. *Ochradenus baccatus*, Delile : Lower Sinde. I believe this to be the Egyptian plant, although the Sinde one differs in some trifling particulars ; my specimens are not sufficiently advanced to show the spinifacient habit.

## VIOLACEÆ.

9. *Viola patrinii*, D.C. : Kurrachee and Hala mountains.

## REAUMURACEÆ.

10. *Reaumuria Hypericoides*, Wild. : Doz Akhooshtee, and spurs of the Hala mountains.

The leaves of the Sinde plant are spatulate-linear and crowded to the ends of the branches.

## SAPINDACEÆ.

11. *Dodonæa Burmanniana*, D.C. : Lower Sinde. This shrub is not more than three feet in height, with leaves about an inch in length, never more, and blunt cuneate-linear. I have some doubt as to the species ; there is another in Sinde of which I have no specimens.

## MALVACEÆ.

12. *Althæa pumila*, Vic. : near Shikarpoor. Plant herbaceous, from six to ten inches.

Stems slender, stellately hairy, stipules ovate, leaves stellate, hairy on both sides, lower ones caudate at base, palmately three-partite with the lateral lobes bifid, the apices roundly tridentate, mid-lobe cuneate, the apex roundly three-five-toothed. Flowers very shortly pedicelled, axillary, blue. Involucre ten-cleft with linear lobes. Calyx half five-cleft, with acute lobes ; anthers about ten ; styles ten, filiform. Stigmas capitate. Carpels arranged round a central shortly ten-winged columella, the apex of which is filiform, not marginate, transversely corrugate, one-seeded.

13. *Pavonia odorata*, Wild. : between Kurrachee and Hyderabad.

14. *Serræa incana*, Cav. : sand-hills, Kurrachee. This plant is rather pretty when in flower ; it forms small bushes about two feet in height. Anthers twenty-five to thirty, stipitate, reniform, one-celled, stigmas ciliate.

15. *Abutilon Indicum* : Sinde and Hala mountains.

16. *Sida acuta* : plains of Sinde.

## TILIACEÆ.

17. *Antichorus (Corchorus) depressus*, Linn. : Khangurh and borders of desert.

18. *Grewia sapida* ? : all hilly places in Sinde. I have doubt-

fully referred this to *G. sapida*, but I suspect it is a very different plant; my specimens are not sufficient to determine; the petals bear a large scale at base and are bifid with toothed lobes. The berry is red and eatable when ripe.

PORTULACÆ.

19. *Orygia decumbens*, Forsk. : eastern base of Hala mountains. The sepals and petals are red, and the stems and leaves are often coloured; this plant does not seem to differ much from *O. trianthemoides*, Heyne.

PARONYCHIÆ.

20. *Cometes Surattensis* : all Sinde.

RUTACÆ.

21. *Peganum Harmala* : all Sinde.

22. *Haplophyllum tuberculatum*, Andr. Juss. : near Deyrah, Boogtee Beloeh hills.

ZYGOPHYLLÆ.

23. *Tribulus alatus*, Del. : eastern base of Hala mountains.

24. *Fagonia Mysorensis* : Sukkur and all Sinde.

25. *Zygophyllum obtusum*, Vic. : valleys of the eastern slopes of Hala range; plants gregarious, herbaceous, decumbent, pale green. Leaves fleshy, simple, spatulate-linear, blunt, or rounded at apex, sessile and subsessile, stipules acuminate, scales at base of stamens deeply bifid. Capsule deeply five-wing-lobed, five-celled, each cell opening inwards, with two to three pendent seeds. Flowers shortly pedicelled, yellow.

26. *Seezenia lanatum*, Wild. : all rocky places in Sinde. The stamens in the Sinde plant are most certainly alternate with the sepals of calyx, and not opposite to them; some doubt may exist with respect to the identity of this plant with that from Sierra Leone, I therefore give my note of it.

Plant spreading, semi-erect, stems and branches flexuose, woolly at the joints within the stipules; younger branches, under surface of leaves, and their margins papillose from sessile glands, otherwise smooth; leaves petioled, opposite, three-foliolate, midleaflet obovate, often retuse, lateral leaflets oblique-ovate, all entire and shortly apiculate, stipules linear, often uniting with the margins of the stipules of the opposite leaf and thus appearing interpetiolarly; flowers green tinged with yellow, axillary, solitary, pedicels in fruit longer than the leaves. Calyx five-parted with a valvate æstivation, lobes lanceolate, each bearing opposite the centre of its base an adherent scale half its length and with free shortly fimbriate margins; stamens five, hypogynous, opposite to the divisions of calyx; filaments slightly flattened, smooth, tapering; style five-



cleft almost to the base, with long linear terete lobes; stigmas capitate, rough; ovary oblong, five-celled and ribbed. Ovules five, pendent from the apex of columella. Capsule five-furrowed and seeded, detaching from base into five cocci, and thus remaining for a long time pendent by short funiculi from the seeds to the apex of columella; the cocci are internally bivalved and perforated on the inner angles of apices for the passage of the funiculi. Columella persistent for a long time after the seeds have fallen, five-angled, with the apex discoid, five-lobed, and with the placentas in the sinuses between the lobes; seeds brown, oblong, acute at both ends, with a scanty green arillus.

## GERANIACEÆ.

27. *Monsonia Asiatica*, Vic. : eastern base of Hala mountains and Lower Sinde.

I believe that this is the first species of *Monsonia* found out of Africa. The Sinde plant belongs to the section "Holopetalum." Plant semi-erect, herbaceous, clothed everywhere with long, white, silky hairs; leaves long-petioled, cordate-ovate, blunt, irregularly dentate, seven-nerved, stipules herbaceous, linear-lanceolate; peduncles slender, two- to five-flowered, with from four to six unequal linear bracts at apex, pedicels slender, flowers blue. Calyx sepals apiculate, three-nerved, petals entire, stamens pentadelphous in a double series. Capsule very longly rostrate.

## ROSACEÆ—Sub-ord. NEURADEÆ.

28. *Neurada procumbens*, Linn. : borders of Sinde desert, at base of Hala mountains, and near Shahpoor. This curious plant has heretofore been noted as a native of Egypt, Numidia and Arabia.

## LEGUMINOSÆ.

29. *Sophora tomentosa*, Linn. ? At Coombe in the Boogtee Beloch hills, a shrub of four feet.

30. *Crotolaria arida*, Royle : borders of desert.

31. *Crotolaria oxalidifolia*, Vic. : eastern base of Hala range. Prostrate or semi-erect, with branches from six to eight inches long, all parts clothed with appressed strigose hairs, stipules lanceo-linear, adnate; leaves petioled, three-foliate, leaflets shortly petiolulate, midleaflet obovate, lateral leaflets oblique, obovate, blunt; peduncles slender, opposed to a leaf; legume sessile linear, trigonous, hairy, nine-seeded and constricted between the seeds.

32. *Taverniera nummularia*, D.C. : Hala mountains, near Deyrah.

33. *Alhagi maurorum*, Tourn. : Sinde passim.

34. *Cassia obovata*, Collad. : Sinde passim; this plant is also abundant in the Punjaub.

35. *Adenantha paroniana*? Near villages, cultivated?

Plants of this order are comparatively rare in Sinde; my herbarium contains only four others, and two of these are *Indigofera*.

URTICACEÆ.

36. *Forskalea ovata*, Vic. : Hala' mountains. Plant rising erect to two feet, all parts clothed with sharp hooked hairs; leaves alternate, triple-nerved, white, tomentose beneath excepting the nerves, lower ones broad ovate, upper ones ovate, all narrowed at base into the petioles and grossly dentate; involucre of four to seven linear-spatulate lobes. This plant comes near *F. tenacissima*, and perhaps may be a broad-leaved variety of it.

ARISTOLOCHIACEÆ.

37. *Aristolochia bracteata* : Lower Sinde.

CHENOPODIACEÆ.

38. *Salsola Indica* : Sinde desert and Halas.

39. *Salsola stricta*? : Upper and Lower Sinde.

40. *Anabasis florida*, M. B. : borders of Sinde desert, and banks of Indus to near Bhawalpoor.

41. *Atriplex verruciferum*, M. B. ? : sand-hills near Kurrachee. I have doubtfully referred this as above, but it is probably a new species. The whole plant is lepidate-hoary and shrubby. Leaves shortly petioled, oblong, ovate, and obovate, blunt, narrowed at base into the petioles, lower leaves often remotely toothed. Upper leaves entire, valves of fruit orbicular with the reflexed entire margins and subcordate bases lepidate, otherwise smooth. Stamens of the male flowers five.

PHYTOLACCACEÆ.

42. *Limeum obovatum*, Vic. : skirts of the Hala mountains near Kotree. Roots ligneous, descending deep into the soil; stems herbaceous prostrate, minutely pubescent. Leaves cuneate obovate and ovate, obtuse with a point, minutely pubescent; flowers opposed to a leaf, three to five together, very shortly pedunculate, pedicels minutely bibracteolate. This plant comes near *L. Capense*.

POLYGONACEÆ.

43. *Calligonum Polygonoides*? : all Sinde. The specific characters of this curious genus are founded on peculiarities of the fruit; unfortunately I have never seen the fruit of our Sinde shrub, and have merely referred it to *C. Polygonoides*, because that plant makes a nearer approach in habitat to Sinde than *C. Pallasia*. This shrub is common throughout Sinde, and is found on the banks of the Indus nearly as far up as Bhawalpoor; near Shahpoor, at the eastern base of the Hala mountains, it is most

abundant, forming small trees of ten or twelve feet high, with a diameter of six to ten inches at base; when in full flower it looks rather pretty.

## MENISPERMACEÆ.

44. *Cocculus leceba* ?, D.C. : Lower Sinde.

## MYRSINACEÆ.

45. *Ægiceras fragrans*, Kon. : mud-flats, Kurrachee harbour.

## CONVOLVULACEÆ.

46. *Ipomœa bilobata* : sand-hills, Kurrachee.  
 47. *Convolvulus lanuginosus*, Desr. : Hala mountains.  
 48. *Convolvulus parviflorus*, Vahl : base of mountains.  
 49. *Breweria evolvuloides* ?, Chois. : Hala mountains. As I feel considerable uncertainty about this plant, I add my note.

Shrub erect, of one to two feet, stems slender, ligneous, all parts densely clothed with a sericeous pubescence. Leaves very shortly petioled, elliptic, upper ones lanceolate, entire, mucronate and emarginate from the reflexed mucro, triple-nerved, pubescence more dense beneath. Flowers axillary, one to three together, sessile. Calyx persistent, not enlarging, with two linear bracts at base; sepals, three exterior and two interior, a little shorter, lanceolate acute, hairy beneath. Corolla with a deeply five-lobed limb, the lobes hairy beneath. Stamens scarcely exsert, filaments broad at base with five short teeth alternating, anthers reniform-cordate, ovary two-celled, ovules four, styles two, divergent, filiform, stigmas discoid orbicular, continuous (not peltate). Capsule chartaceous, dry, hairy towards apex, longer than the dry calyx, two-celled, septa membranous, four-valved; seeds from two to three, oblong, black, very minutely scrobiculate, of a nutty hardness.

50. *Evolvulus linifolius* : base of Halas.

51. *Cressa Cretica*, var. *Indica* : all Sinde.

## SCÆVOLACEÆ.

52. *Scævola Taccada*, Roxb. : tops of sand-hills near Kurrachee.

## PLANTAGINEÆ.

53. *Plantago amplexicaulis*, Cav. : Hala mountains.

## PLUMBAGINEÆ.

54. *Ægialitis obovata*, Vic. : sand-hills, Kurrachee. Shrub of two feet, stems ligneous, annulate with the ensheathing bases of fallen leaves, densely foliaceous upwards; leaves blunt cuneate-obovate, retuse, glaucous hoary, smooth, articulated to the sheaths at base, spikes paniculate, flexuose, terminal flowers secund, utriculus bursting at the apex into five short acute teeth.

BORAGINEÆ.

55. *Heliotropium Rotleri* : Kurrachee.

56. *Echium*? : Hala range. I am unable to refer this to any of the many described species, and therefore attach my note.

Plant fruticose, erect, about a foot in height, growing from fissures in rocks. Younger stems, leaves and calyces densely clothed with short appressed strigæ. Leaves five to six lines long, ligulate-linear, blunt-pointed, sessile, alternate. Racemes simple, many-flowered; flowers solitary, sessile, secund, bluish white, bracts like the leaves but smaller, bracteoles none, pedicels short, adherent to rachis for half their length. Calyx with blunt linear unequal segments (sometimes only four, the fourth broader); tube of the corolla ten-nerved with a ring of hairs within at base, smooth in the middle, and the faux closed with hairs which indistinctly form five very small tubes between the anthers; lobes of limb patent, blunt-ovate, slightly auricled at base (one lobe often broader). Margins minutely and remotely toothed. Stamens not exsert, filaments very short, anthers mutic, linear-oblong blunt and undivided at base, style shortly exsert, its base becoming angular in seed; stigma peltate capitate with two minute central points; achenia rather smooth with an incurved point, one or two, often only one maturing, attached to base of style, perforation at base oblong triangular.

57. *Trichodesma Indica*: Sinde passim.

58. *Trichodesma Africanum*, R. B.? : Hala mountains.

I have referred this to the above with some doubt; it has the same prickly hispid habit, but differs in some particulars; plant growing from fissures in rocks, erect, 1 to 1½ feet. Leaves and stems dark green, hispid from hard white prickle-bearing calli, leaves opposite at the divisions of the racemes, otherwise alternate, upper leaves subsessile, lanceolate, acute, prickles longer on the margins and midrib beneath. Racemes lax, the lower ones from opposite axils, upper from alternate axils and terminal; peduncles usually three-flowered, lengthening with the enlarging calyx in seed; bracteoles none; calyx rigid, hairy, five-angled with rounded auricles, segments acute, corolla blue with caudate lobes, stigma simple, blunt, pedicels lengthened with the much-increased and nutant calyx in seed, achenia four, subtriangular, the outer faces concave, marginate, the margin acutely serrulate with slightly glochidiate teeth.

My specimens do not exhibit the lower leaves.

LABIATÆ.

59. *Salvia Ægyptiaca*, Linn. : slopes of Hala mountains.

60. *Salvia pumila*, Benth : slopes of Hala mountains.

61. *Salvia Halaënsis*, Vic.: slopes of Hala mountains. Plant of ten to twelve inches, erect; old stems ligueous, younger stems obsoletely four-angled, densely clothed with short hairs and sessile yellow glands; leaves much-corrugated, cordate-ovate and broad-ovate, blunt or rounded; slightly winging the short petioles, and often forming two lateral denticulæ at their apices; margins undulate lobate-crenate. Racemes two to three inches long, dense-flowered, subspicate; flowers blue, solitary, almost sessile; floral leaves small, bractea-formed, ovate, entire, hairy and longly ciliate; bracteoles nearly as long as bracts, linear-lanceolate, hairy; calyx lanato-pilose, enlarging and becoming nutant with the lengthening pedicel; upper lip shortly tridentate; the mid-tooth smaller, all acute, lower lip bipartite with linear filiform lobes. Corolla, upper lip erect, short, bifid; mid-lobe of lower lip orbicular emarginate.

The achenia of this plant give out much mucilage in water.

#### VERBENACEÆ.

62. *Verbena officinalis*? : spurs of the Hala mountains, Lower Sinde. I have referred this doubtfully to *V. officinalis*. The foliage of my specimens is from the ends of the flowering branches. The leaves are petioled, opposite and alternate, both surfaces shortly pilose, ovate and broad-ovate, blunt or emarginate, five-nerved, margin serrate, with the three serratures at the apex larger.

#### SCROPHULARINÆ.

63. *Linaria sindensis*, Vic.: base of Hala mountains, Upper and Lower Sinde. This plant is extremely like *L. triphylla*. Herbaceous, stems procumbent or semi-erect, eight to ten inches; leaves scattered, solitary, glaucous, entire, ovate, narrowed into and winging the petioles; apices soft-pointed; young leaves often shortly pubescent; flowers purple tinged with yellow, subsessile, axillary, solitary, bracteoles none; upper lobe of calyx foliaceous, broad-ovate, greatly exceeding the other four linear-lanceolate lobes; lower stamens with their anthers united; stigma simple; capsule obliquely globular, two-celled, upper cell abortive, lower cell many-seeded, bursting irregularly; seeds conical. Testa spongy, furrowed.

*Linaria ramosissima*, Wall.: Hala mountains. The Sinde plant is softly pilose, in other respects it is the same.

*Anticharis*, Endlich.: Hala mountains.

*A. viscosa*, Vic. This plant belongs most certainly to Endlicher's genus, and probably to the very species, but as I have no means of referring to the specific characters given, I have allowed my herbarium name to stand for the present.

The Sind plant is so viscous that everything adheres to it. Flowers blue; leaves ovate-lanceolate, narrowed into the short petioles: pedicels short, minutely bibracteolate above the middle: seeds truncate, oblong, longitudinally grooved with minute transverse striæ.

SOLANACEÆ.

*Solanum Forskalii*, Dun.; *cordatum*, Fors.: Hala mountains. Both species appear to be different forms of the same plant; our Sind plant is sometimes prickly, sometimes not; the leaves are variable also. Stems slender; prickles both curved and straight, near the ends of the branches only; young shoots and leaves starry pubescent, old leaves smooth, round-cordate or subcordate at base, narrowed into the petioles, margin entire or occasionally sinuate toothed; flowers rather longly pedicelled, blue; the corolla greatly exceeding the half five-cleft calyx; berry red, smooth, rather larger than a pea.

*Physalis somnifera*, var. *flexuosa*: all Sind and Hala mountains.

*Hyoscyamus muticus*, Linn. Hala mountains.

APOCYNÆ.

*Rhazya stricta*, Decaisne. This shrub is abundant in the Hala mountains and at their eastern bases, but particularly at Shahpoor. It usually grows upon sand-hills, and has somewhat the habit of our garden oleander, but does not rise to more than three feet. The flowers are pale blue turning white by age. There is a small entire margined nectarium.

ASCLEPIADEÆ.

*Periploca aphylla*, Dec. Bot. Jacq. All hilly parts of Sind. This is my friend Dr. Falconer's *Campelepis*, Ann. Nat. Hist. vol. x. p. 362. This shrub abounds in the Boogtee Beloch hills near Deyrah.

The habit is that of *Orthanthera viminea*; the branches are devoid of all pubescence. The leaves are linear-lanceolate (not ovate), and are seen only on the young surculi. The flowers are of a dark dull red colour; the long uncinatè filiform processes of the faucial corona are inflected over the genitalia in the earlier stages of the flower, but subsequently become reflexed through the divisions of the corolla. The pollen of this plant requires to be re-examined in the fresh flowers; in my opinion it not only differs from that of *Periploca*, but from the pollen of every genus of the order.

*Orthanthera viminea*. All Sind.

With few exceptions the above-noted plants are foreign to our *Ann. & Mag. N. Hist.* Ser. 2. Vol. i.

Indian flora, flourishing between the parallels  $25^{\circ}$  and  $30^{\circ}$  N. lat., or nearly equivalent to the tract between Allahabad and Hurdwar. At first sight it appears strange that so many northern forms should exist in Sinde in excess of those found between the same parallels in India, but a slight examination of the countries forming our northern frontier will, I think, sufficiently account for it. The Himalaya mountains, the Hindoo Coosh, and probably the Tukt-i-Sulleemaun range, form an impassable barrier to certain classes of plants, but the lower ranges of the Hala mountains, which in many places are not more than 1500 feet above the sea, offer no such obstacle; besides this there is the coast-line, which with its constantly drifting sands offers a facile mode of transmission to seeds; thus we find several Egyptian, Arabian, Persian and African plants in Sinde: that they have not spread into India seems also easily accounted for; the Indian desert of Jesulmeer proves in a south-eastern direction a sufficient preventative. The course *viâ* the banks of the Indus is to a narrow extent only open to the north-east, and accordingly we find some Egyptian forms extending to Delhi and its neighbourhood, as has been remarked by my friend Dr. Royle in his 'Illustrations of Indian Botany,' pp. 70 and 160.

*Salvadora persica*, *Capparis aphylla* and *Farsetia*, are found throughout Sinde; however *Giseckia*, so abundant near Perozepoor, is not found in Lower Sinde; *Orobanchè Calotropidis*, Edgw., is found from Umballa to Kurrachee, and is extremely abundant in Lower Sinde; the flowers of this plant are changeable, being blue at first and becoming pale yellow, hence two varieties have been supposed to exist. No Scitamaneous or Orchideous plant exists in Sinde; of the latter order *Zeuxine* is sparingly found under the tamarisks, nearly as far as Subzul-kote, following the course of the river.

The coast-line alluded to above offers no obstacle to the diffusion of plants in a southerly direction *viâ* Cutch and Goozerat towards Bombay, but as yet these countries, the delta of the Indus and the south-western tail of the desert are botanically unknown; in the other direction, a botanical excursion to Sommeance Bay, or farther if possible, would serve to connect our Indian flora with that of Africa, Persia and Arabia.

I have still some curious Sinde plants of which I hope to give an account hereafter.

Subathoo, 27th September, 1847.